Sept. 11, 1923. 1,467,506

H. SCHWENKE

METHOD OF COOLING COKE

Filed June 24, 1920 3 Sheets-Sheet 1

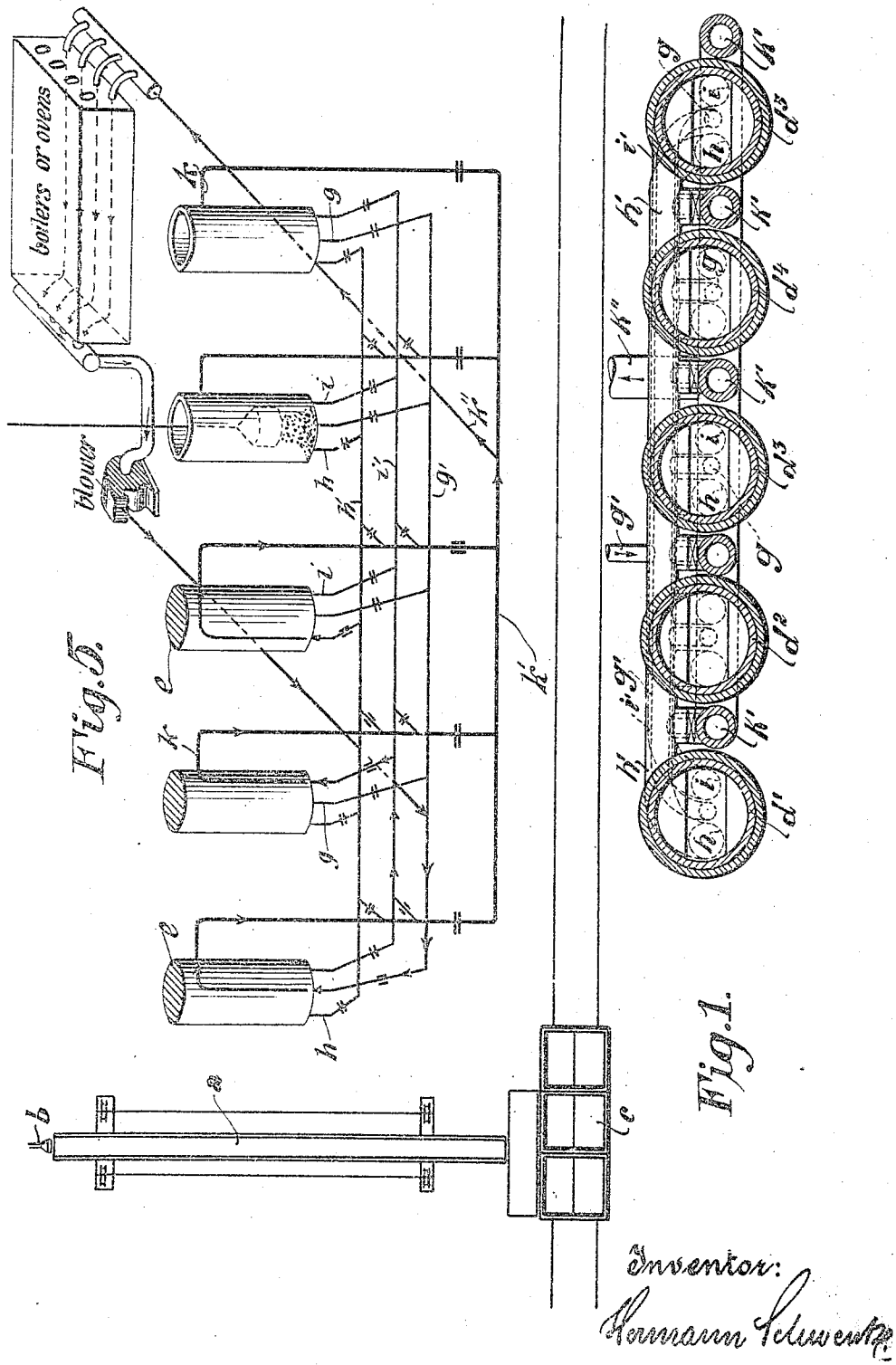


Fig. 1.

Fig. 2.

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Filed June 24, 1920 3 Sheets-Sheet 2

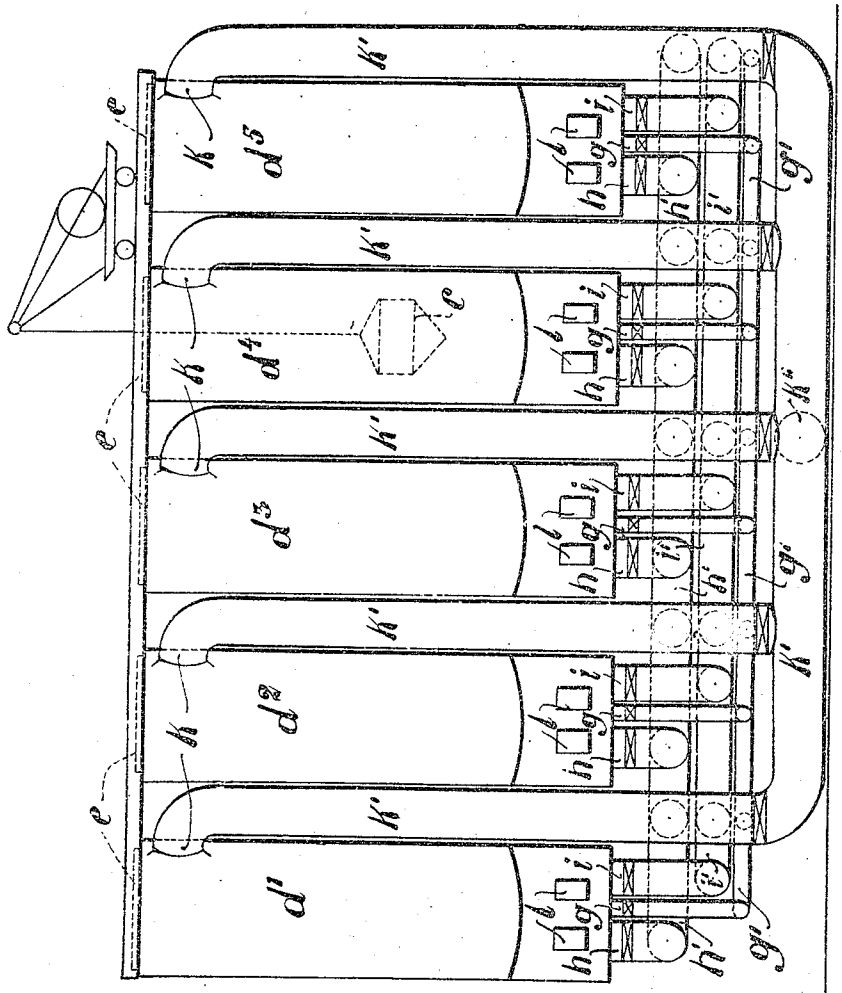
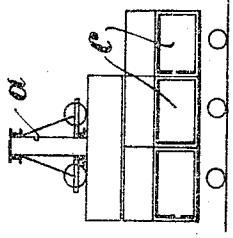


Fig. 2.



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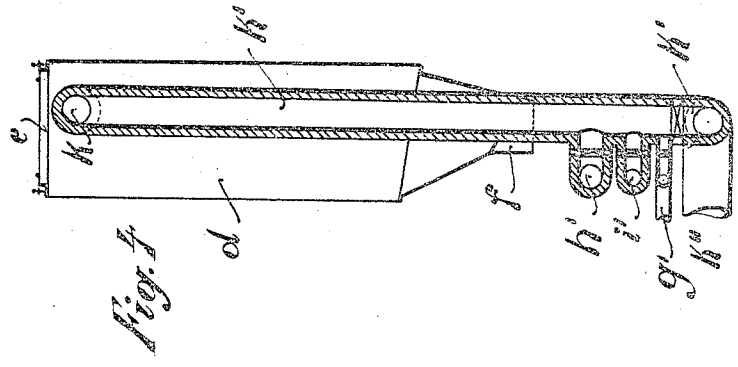


Fig. 4

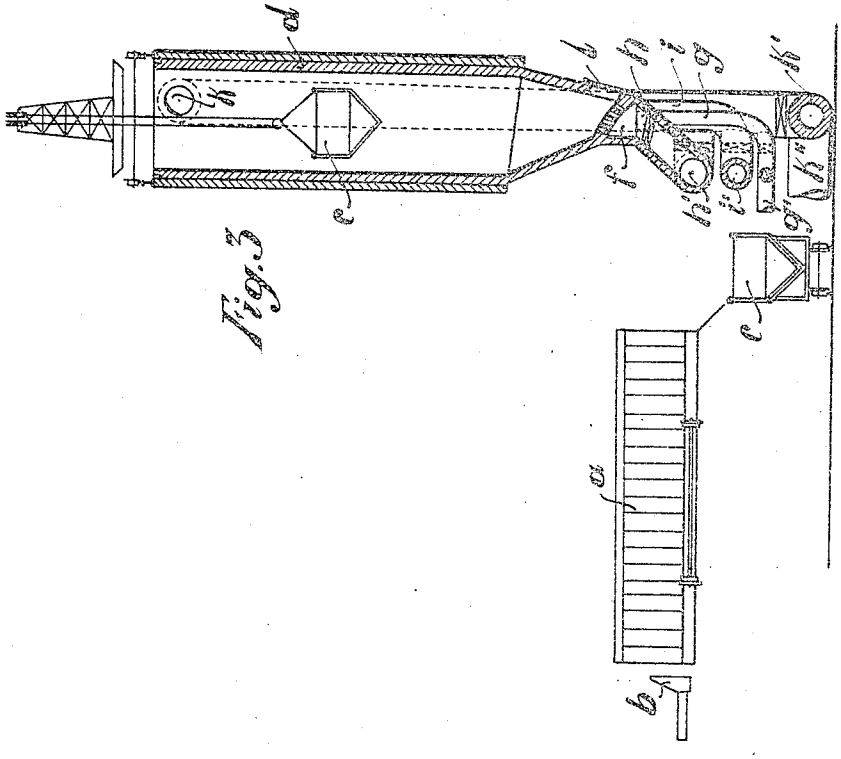


Fig. 3

Inventor:
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Patented Sept. 11, 1923. 1,467,506

UNITED STATES PATENT OFFICE.

HERMANN SCHWENKE, OF HERRINGEN, GERMANY, ASSIGNOR OF ONE-HALF TO ZECHE DE WENDEL, OF HAMM, WESTPHALIA, GERMANY, A CORPORATION OF GERMANY.

METHOD OF COOLING COKE.

Application filed June 24, 1920. Serial No. 391,530.

To all whom it may concern:

Be it known that I, HERMANN SCHWENKE, a German citizen, residing at Herringen, Westphalia, Germany, have invented certain new and useful Improvements in Methods of Cooling Coke, of which the following is a specification.

My invention refers to the art of coking and its particular object is a novel method, as well as a device for carrying it into effect, of dry-cooling the coke.

It has been tried repeatedly to choke or dry-cool coke, but the methods proposed up till now and which considered the use of indifferent gases passing through the coke or of a cooling liquid circulating in hollow walls of a cooling chamber, have proved to be commercially useless. All methods of working which have been made public up till now involve the drawback of requiring a separate treatment of the individual cake and therefore resulting in a non-continuous operation dependent, as far as time is concerned, upon the pushing of the cakes. For the same reason the heat taken up by the cooling medium and which is intended to be used for instance in the generation of steam, does not leave the cooling chamber with a constant high temperature but diminishes gradually in accordance with the progress in cooling. Along with this gradual cooling down of the coke-cake, as it is being subjected to the cooling treatment, the efficiency of this treatment changes to the worse.

According to the present invention, now, the dry-cooling of coke by means of indifferent gases is improved by transporting the coke as it leaves the oven, into a separate cooling chamber adapted to take up a plurality of charges, a uniformity of cooling and supply of heat by way of the cooling medium being obtained by each fresh charge which arrives with the heat of the oven, being fed into the cooling chamber at the end where the cooling medium leaves it, while in contradistinction thereto the fresh cooling medium is introduced at the end where the cooled coke is discharged. By proceeding in this way not only the lack of continuity of the methods hitherto proposed is obviated in this sense that the cooling chamber forms a sort of accumulator inserted between the non-continuous heat supply and the continuous demand, such as is the case for instance with the well known heat storage for waste steam, but also the cooling conditions are themselves greatly improved. For by means of the counter currents available according to my invention a state of permanency, as far as the cooling is concerned, is kept up in so far as now the drop in temperature between the cooling medium and the coke which shall be cooled will now remain substantially constant, whereby also the efficiency of the cooling remains constantly high. In consequence thereof the cooling medium leaving the chamber charged with heat presents a uniform high temperature, whereby a more perfect utilization of the heat is obtained.

In the drawings affixed to this specification and forming part thereof the preferred form of an installation lending itself to the carrying into practice of the method described above is illustrated by way of example. In the drawings

Fig. 1 is a plan,

Fig. 2 a side elevation, and

Figs. 3 and 4 different vertical sections.

Fig. 5 is a diagram illustrating the novel method.

Referring to the drawings for illustration of the novel method forming the primary object of the present invention, I prefer proceeding as follows:

In order to be able to utilize the coke storing place in the existing plants, I first of all cause the coke to be pushed into a chamber movable on wheels and having its inner walls lined with strong cast iron plates, said chamber being run on to the coke storing place and in front of the head of the group of ovens where its content can be pushed by means of a stationary pusher into a truck c consisting of three troughs. The troughs c rest loosely on the truck and may be lifted thereoff by a hoist and be emptied by opening them. The coke taken up by the troughs is lowered into the cylindrical cooling chambers d^1, d^2, d^3, d^4, d^5, the hot coke thus uniformly filling the cooling chamber suitably lined with refractory bricks. Each chamber d holds from 35 to 60 tons coke, that is to say, between 4 and 7 charges and is closed, after having been filled, by a cover e. The cooling gases enter through a chamber f having three nozzles g, h, i connected to the pipes g', h' and i' respectively communicating with all the cooling chambers and provided with clos-

ing devices. Underneath the cover of each cooling chamber there is further disposed an outlet k connected, by aid of pipe k', having suitable closing devices inserted, with pipes g', h', i', which the pipe k'' leading to the boilers or ovens is connected to.

The cooling gases are forced by means of a blower through the pipe g' into the first cooling chamber where they cool the coke contained therein and take up heat, whereupon they pass through pipes k' and i' into the second cooling chamber in order there to be heated further. The pipes k' and h' then lead the gases into the third cooling chamber, filled last of all and therefore containing the hottest coke, so that the gases reach the boilers or ovens with a high temperature, there to spend their heat and to be carried anew into the cooling chambers; the fourth and fifth cooling chambers are emptied and filled afresh during this time. After the first filling has cooled down, the first cooling chamber is cut off, while the second is thrown in so that the gases are always blown through three cooling chambers one after the other. As shown in the foregoing description there exists a true cycle of working between the five chambers, such as is frequently established for various purposes and which most reliably safeguards the desired mode of proceeding.

The conduits for the hot gases are suitably protected against losses of heat. The emptying of the cooling chambers is effected by aid of valves l which allow the coke to slide on to a loading device. The passage of the cooling gases through the cooling chambers is regulated in such a manner that the average output of a battery of ovens is perfectly cooled in the cooling plant while a fresh charge is being treated in the ovens.

I claim:

1. The continuous method of cooling coke which consists in arranging hot coke in discrete masses, each mass having a different temperature, passing inert gases therethrough in series in the order of the increasing temperatures prevailing therein, replacing the mass of coke first reaching the desired temperature by fresh hot coke and so altering the path of the inert gases that this fresh coke shall be the last in the series to be treated with the gas, all in a continuous process.

2. The continuous method of cooling coke which consists in arranging hot coke in discrete masses, each mass having a different temperature, passing inert gases therethrough in series in the order of the increasing temperatures prevailing therein, replacing the mass of coke first reaching the desired temperature by fresh hot coke and so altering the path of the inert gases that this fresh coke shall be the last in the series to be treated with the gas, all in a continuous process, the inert gas being made to move in a cyclic path and the heat being extracted from it between its passing out from the hottest coke and its introduction into the coolest mass.

In testimony whereof I affix my signature.

HERMANN SCHWENKE